Measuring the RETURN on INVESTMENT for CTE

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BY PRADEEP KOTAMRAJU

Career and technical education (CTE) is increasingly being seen as a major contributor to the recovery of the U.S. economy. However, questions exist as to the effectiveness and impact of CTE. One is whether the federal investment (Carl D. Perkins Act) in CTE is paying off. To answer this, we need to establish the *internal efficiency* of CTE by comparing the costs and benefits of implementing CTE at the local or state levels. A second question is whether CTE has a measurable impact. This question focuses on *external effectiveness*.

Answering these questions may put to rest the frequently held notion that CTE—and by association Perkins—has been largely ineffective in impacting U.S. education and workforce development. In this article, I will refer to the measurement of the internal efficiency and external effectiveness of CTE as the ROI for CTE. This article summarizes the contents of the *ROI Guidebook for Career and Technical Education,* which will be published by the National Research Center for Career and Technical Education (NRCCTE) this month.

The Raw Materials for Conducting ROI: Terminology

Developing ROI for any organization begins with identifying different indicators, usually sorted into inputs, process measures, outputs, and outcomes. *Inputs* involve the human, financial and physical resources received to support programs, activities and services; from the perspective of CTE programs, examples might include funding, enrollments and staffing indicators. *Process measures* include the means used to deliver programs, activities and services—assessment of student learning, use of technology and teacher training all constitute process measures. *Outputs* reflect the quantity of products actually produced—examples include the number of degrees awarded, the number of majors in a program, the number of students who have transferred to other institutions, or the number of students who have graduated. *Outcomes* cover the quality of programs, activities and services—or their benefits—to students, states or society. Common outcome measures in postsecondary CTE include retention, graduation and transfer rates; time to degree; test scores; and job placements, among others.

With their emphasis on quantity, inputs are easy to count. On the surface, they are easier to assess and understand and generate less controversy within the education community. Process measures may be harder to comprehend because they reflect non-measurable, qualitative elements in an organization. Outcomes are sometimes subsumed under the heading of outputs, but distinguishing the two as separate measures is critical when policy values (*e.g.,* efficiency, equity, choice or quality) are being discussed. Outputs denote quantity and are therefore measureable and easy to compare. Outcomes represent policy values, which are much more elusive and subjective. Although measuring outcomes is difficult, it is necessary because outcomes are the only true mea-

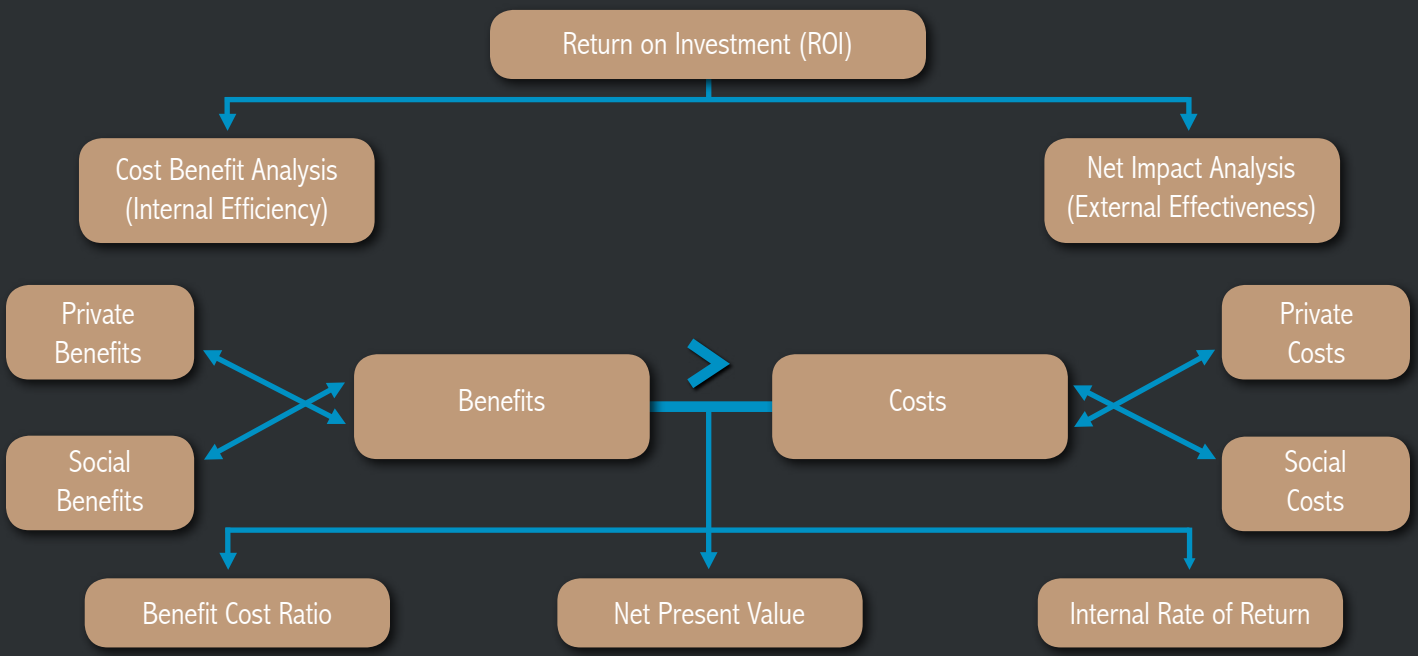

FIGURE 1. ROI terminology: How does it all connect?

sure of ROI. They are usually expressed as questions: Are students learning well? Are clients in a training programs getting jobs? Are faculty responsive to students? Is the institution serving the community appropriately?

ROI usually takes a balance-sheet approach, chalking up benefits and costs, as shown in Figure 1. Benefits and costs themselves are divided into private (*i.e.*, internal to the program) and social (*i.e.*, external to the program) categories. Benefits and costs must include the monetized values of all non-monetary benefits and costs to fully measure the internal efficiency and external effectiveness of a program.

ROIs require the calculation of five things: (a) the *opportunity cost*—a measure of what is being given up in order to undertake the activity; this measure is used to quantify costs and benefits; (b) the *time horizon*—or how long the program will be in place, when benefits will begin to be observed and fully realized, and when costs will begin to appear and fully accrue; (c) the *discount rate*—the appropriate rate that needs to be applied in order to convert the value of future costs and benefits to the present time; (d) *monetization*—the translation of all non-monetary benefits and costs into monetary values; and (e) *externalities*—the measurement of the negative and positive impacts of all monetary and non-monetary benefits and costs that result from having the program in place. When any or all of these calculations are not undertaken, the result is invariably the under- or over-estimation of costs and benefits, which in turn skews the following measures.

Broadly speaking, ROI is reflected by numbers: these include the *benefit cost ratio* (B/C; a number greater than one implies that the program is justified on both internal efficiency and external effectiveness grounds); the *net present value* (NPV; a number greater than zero implies that building the program today is justified instead of waiting for the future); and the *internal rate of return* (IRR; when the rate of return obtained from program implementation exceeds the market interest rate; this is the measure used to determine returns from financial investing).

Steps in Conducting ROI: An Integrated Logic Model

There can be as many steps to conducting ROI analyses as there are terms and terminology used to describe them. Here are five steps, each addressing a primary question:

- ***Needs Assessment***: What are some of the gaps the program will fill?
- ***Feasibility Study***: Given certain constraints, can the program succeed?
- ***Process Evaluation***: How is the implemented program progressing?
- ***Outcome Evaluation***: Were program goals and objectives achieved?
- ***Cost Analysis***: Was the program financially worthwhile or valuable?

As indicated in Figure 2, the logic model for ROI involves completing all

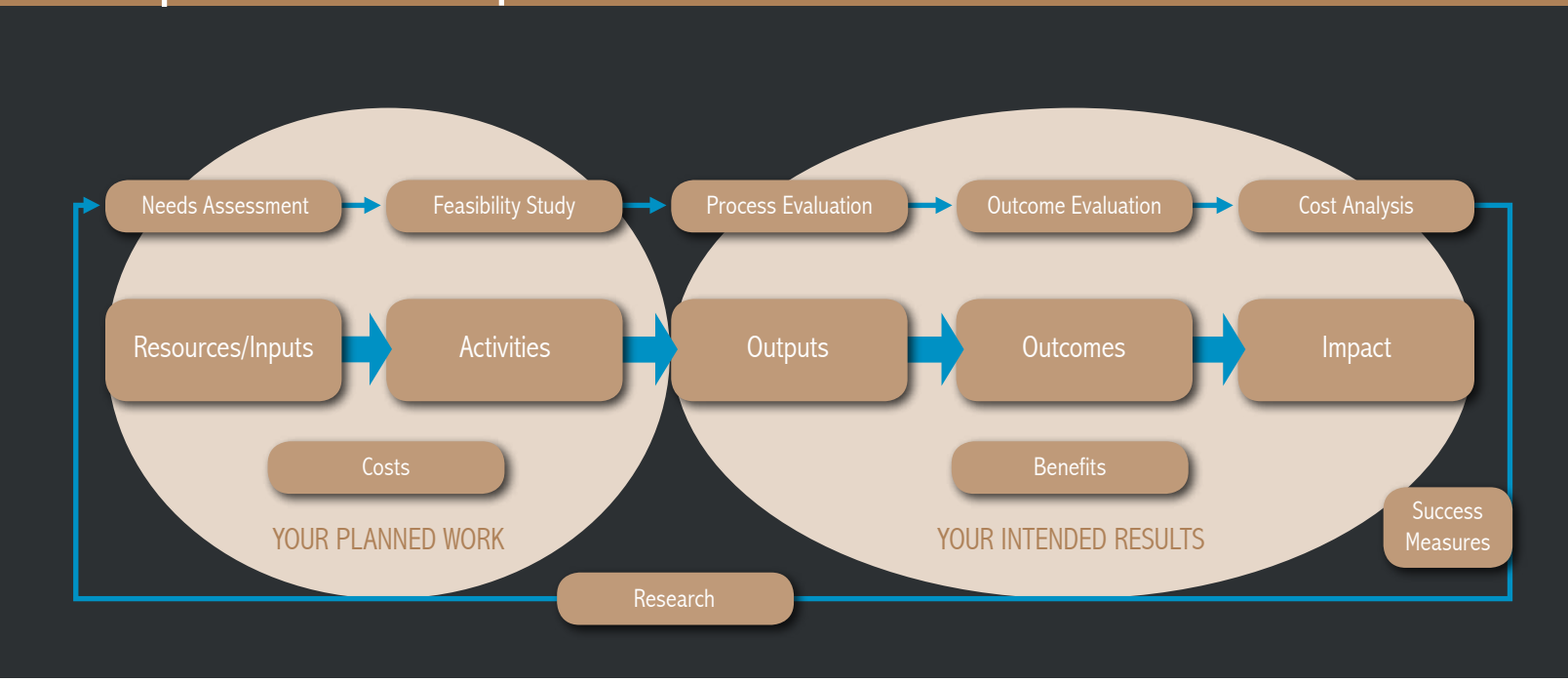

FIGURE 2. The logic model for measuring ROI.

five steps and answering each question sequentially. Each step focuses on collecting the four key indicators—inputs, process measures, outputs, and outcomes—from which costs and benefits are derived and a corresponding success measure is obtained. Underlying the entire logic model are scientifically based research methods, which when implemented properly generate optimal ROI analyses.

ROI for CTE: Applying Different Techniques

ROI is generally conducted in three ways:

- ***The common framework technique*** must meet the following four preconditions: It must include (a) well-developed, integrated conceptual frameworks; (b) advanced institutional research and evaluation expertise; (c) highly connected data systems; and (d) sound data administration and superior management knowledge and oversight. This technique requires, at a minimum, the explicit linking of education and workforce databases to measure the impact of a particular investment on both direct and indirect beneficiaries.
- ***The social benefits technique*** measures the total benefits that accrue from initiating a specific programmatic action (*e.g.*, reducing the number of CTE dropouts). The programmatic action has both direct and indirect impacts. The direct impact is quantified as that which immediately benefits the program's target population. The indirect impact is generally quantified as a measure of the gain to the community. For example, an indirect impact could be stated as the following: by moving "X" number of CTE students from dropout to graduation status, a "Y" increase in tax collections would result. Matching these direct and indirect benefits against program costs provides a benefit-cost ratio for the action.
- ***The case study technique*** identifies the factors that influence the success of selected CTE programs, and whether such programs are achieving a reasonable ROI compared to similar programs. A program may be a school, a specific occupational program within a school, a specific pedagogy, or an administrative structure that leads to improved student performance.

The NRCCTE's *ROI Guidebook for Career and Technical Education* will present examples of the common framework, social benefits and case study techniques that have been conducted at local and state levels.

ROI for CTE: Where We Stand

Conducting ROI for CTE has been difficult. Recently, the NRCCTE produced an ROI for CTE study that provided a primer for conducting ROI under the four preconditions required by the common framework technique (Hollenbeck, 2011). This study found that participants in CTE programs reaped substantial returns—positive earnings—with almost nil or negative costs associated with secondary CTE. At the postsecondary level, any associated participation costs (*e.g.,* tuition, foregone earnings) were more than outweighed, even over the short term, by the economic payoffs of participating in CTE. The common framework technique used by Hollenbeck has been applied to CTE infrequently because most states and

districts find it difficult to meet all four of these preconditions. The field needs to find less stringent alternatives without sacrificing rigor.

When the common framework technique is too difficult to conduct, a typical alternative approach is to cull data on benefits and costs from a variety of different studies and apply the social benefits technique. What distinguishes the social benefits from the case study technique is a matter of scale: The social benefits technique is generally used when ROI calculations involve both direct and indirect impacts, and the latter usually outnumbers the former; the case study technique focuses more on direct impacts.

Consider this example. An Alliance for Excellent Education study (AEE, 2010) calculated that about $260,000 per dropout would be saved over the student's lifetime if the current dropout rate (30 out of 100) were reduced to zero. This study also noted that graduating from high school generates approximately $10,000 in additional annual income. The case study technique might focus on this number. About 1.3 million high school students drop out every year. AEE then estimated that the lifetime economic gain reaped by eliminating high school dropout would be about $335 billion, a number that would be provided when applying the social benefits technique.

The NRCCTE has been conducting detailed analyses of National Center for Education Statistics (NCES) sample survey data and has developed a typology of CTE course-taking (Kotamraju, Aliaga, and Dickinson, 2011). We estimate that nearly half of all high school graduates take at least three or more CTE credits. We have also established that high school students completing three or more CTE Carnegie credits are less likely to drop out than those taking between zero and one CTE credits (Aliaga, 2011). That means that approximately $168 billion of the lifetime gain from reducing the dropout rate to zero can be attributed to intensive CTE coursetaking. These ROI calculations were made possible by using different studies that each applied their own unique assumptions and specific methodologies. In such conditions, care must be taken to state and describe these differences clearly, addressing any inconsistencies and how they have been handled. The NRCCTE ROI Guidebook will demonstrate this more explicitly.

Given current policy and budget pressures, CTE needs to advocate for itself and develop its own ROI strategy. Otherwise, ROI for CTE will be conducted by others, with results the field may not like. T

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Pradeep Kotamraju

is the deputy director of the National Research Center for Career and Technical Education, University of Louisville. He can be contacted at pradeep.kotamraju@nrccte.org.